

**REMARKS/ARGUMENTS**

This is in response to the Office Action dated April 9, 2004 which has been carefully considered.

Claims 1, 3, 4, 7, 9-11, 13, 14, 16-23, 28-31 and 33-35 stand rejected under 35 U.S.C. § 103(a) as being obvious over Abend, U.S. Patent No. 5,710,215 ("Abend") in view of Boutillier U.S. Patent No. 5,189,096 ("Boutillier"). Further, claims 1, 3, 4, 6, 9-11, 14, 16-18, 20-23, 28-31 and 33-35 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Vanhaeren WO91/14727 ("Vanhaeren"). Based on the preceding amendments and following arguments the rejections are respectfully traversed.

Independent claims 1 and 31, and therefore all claims in this application, are limited to reactive hot-melt adhesives made of certain **unsymmetrically** (or asymmetrically) substituted polyisocyanates which, due to the unsymmetrical substitution have isocyanate functions of different reactivities. In addition, the claims have been amended to recite that the various components of applicants' reactive hot-melt adhesive are homogeneously distributed therethrough. The amendment supporting the recitation of unsymmetrically substituted di- and/or polyisocyanate having isocyanate functions of different reactivity is supported in the specification, e.g. at page 5, line 15 over to page 6, line 7. Support in the amendment relating to the homogenous distribution of the reactive hot-melt adhesive components is found, e.g. in the specification at page 9, lines 18-20; page 13, lines 11-13 and original claims 2, 11 and 14.

The presence of unsymmetrically unsubstituted di- and/or polyisocyanates having isocyanate functions of lower and higher reactivity - either alone or in mixture with other, symmetrically substituted isocyanates - has the advantage that only the NCO-function with **higher reactivity** reacts with isocyanate-reactive polymer while the NCO-function with the lower reactivity

remains mainly unreacted in the inventive hot-melt adhesive so that the unreacted NCO-functions remain available for the subsequent cross-linking process. In other words, the presence of unsymmetrically substituted di- and/or polyisocyanates having isocyanate functions of **different reactivity** as now recited ensures a high degree of free NCO-functions in the hot-melt adhesive of the present invention. In addition, the claims have been amended to add that the unsymmetrically substituted isocyanates are incorporated in **homogenous**, i.e. uniform distribution throughout the matrix which contains the isocyanate-reactive polymers and the non-isocyanate reactive components (polymers, waxes and/or resins).

The homogenous distribution is made possible in the present invention due to the presence of the non-isocyanate-reactive polymer, wax and/or resin which prevents a premature reaction between the isocyanates and isocyanate-reactive polymers. When the reactive hot-melt adhesive element of the present invention is heated above room temperature, cross-linking takes place very rapidly since the single components are distributed homogeneously throughout each other so that they will come into contact with each other for the cross-linking reaction very rapidly without first requiring diffusion to a reaction site.

Turning now to the rejection of the claims based on obviousness over Abend in view of Boutillier, it is respectfully submitted that the Examiner's assertion that Abend "shows, in the method of Fig. 1, making a homogenous mixture" (Para. 3 of the Office Action), is not well taken. In fact, Abend states exactly the contrary. The disclosure of Abend is specifically directed to **inhomogeneously** mixed components. See, for example, the abstract, which, in pertinent part, reads as follows:

The invention proposes the following method of reactive melts which are especially useful as hot-melt adhesives:

- (a) suitable hydroxy functional or amino functional polymers or polymer mixes (A) which become liquid at temperatures above 40°C are **inhomogenously** mixed with ...
- (d) the inhomogenous mixture is extracted in a form suitable for the intended use and solidified by cooling below the mixture's softening point.

See, e.g. column 7, lines 14-17:

An initial embodiment of the method according to the invention, as represented in Fig. 1, the control **nonhomogenous** mixture of both the components according to the invention ...

See also at column 7, lines 49-57:

According to this invention, the static mixers permit **nonhomogenous** mixing of the components and the formation of partial areas or zones in which use is not made of the number of mixing elements which would otherwise be necessary for complete homogenous mixing: homogenous shall mean here that the concentration of a soluble, compatible, mixable component in a partial area of 1 mm<sup>2</sup> does not deviate by more than 2% from the average value within the entire mixture.

In other words, Abend has separated the deactivated solid isocyanates from the isocyanate-reactive polymers thereby achieving an enhanced stability of his reactive hot-melt (see, e.g. Abend at col. 5, lines 6-19).

Again, Abend, in stark contrast to applicants' invention, teaches reactive hot-melts based on an **inhomogenous** mixture of isocyanate-reactive polymers on the one hand and powdered solid surface-deactivated polyisocyanates on the other hand. This inhomogenous distribution results in areas with high concentrations of isocyanate-reactive polymers. Again, it is the separation of the reactive components in Abend which form the basis for the stability of the disclosed hot-melts at room temperature.

Accordingly, Abend teaches away from the present invention in which all components are homogeneously distributed. In Abend, the isocyanates, which according to Abend must necessarily be surface-deactivated, form an inhomogenous mixture with the isocyanate-reactive polymers in order to achieve sufficient stability ... whereas applicants' invention allows the homogenous

distribution of isocyanates and isocyanate-reactive polymers due to the presence of non-isocyanate-reactive polymers, resins and waxes. In the present invention the stability of the reactive hot-melt adhesive is based on the presence of non-isocyanate-reactive polymers, waxes and/or resins while in Abend stability is only achieved by inhomogenously mixing the otherwise reactive compounds. Thus, Abend's solution to the problem of making a stable reactive hot-melt adhesive is very different from that of the present invention and so is the claimed composition.

Boutillier does not supply the teaching missing from Abend. First, the requirement that the Abend composition be an inhomogenous mixture of components cannot be ignored away because it represents the very essence of Abend's invention. Second, there is nothing in either Abend or Boutillier which would teach or even suggest to combine the two teachings and arrive at the claimed invention. It is well settled that obviousness cannot be established by combining pieces of prior art absent some teaching, suggestion, or incentive supporting the combination. *In re Geiger*, 2 U.S.P.Q.2d 1276, 1278 (Fed. Cir. 1987). No such reason exists here. Each of the various references cited fails to disclose particular components of the claimed invention. There is no suggestion in the prior art to select the particular component from each of them, while excluding certain others, to arrive at the claimed invention. It is respectfully submitted that the Examiner's obviousness position is an exercise in hindsight, which is an impermissible basis for the rejection. See *In re Fine*, 5 U.S.P.Q. 1596, 1600 (Fed. Cir. 1988) ("One cannot use hindsight reconstruction to pick and chose among isolated disclosures in the prior art to deprecate the claimed invention.").

As mentioned above, Boutillier fails to supply the teaching lacking in Abend. Boutillier is directed to a cross-linkable hot-melt adhesive composition which is curable by atmospheric moisture. That means that it is not storage stable (col. 4, lines 17-28). Abend as well as the present

invention, however, are directed to reactive hot-melt adhesives which are stable at least at room temperature. Boutillier simply mentions that an optional additive such as a tackifying resin can in part improve the bonding power to the cross linkable hot-melt adhesive. This does not mean, however, that a tackifying resin can be added to the hot-melt adhesive of Abend, particularly in an amount of up to 60% w/w as claimed.

Again, the stability of Abend's reactive melts is based on two things: (1) he must use surface deactivated isocyanates and (2) he must distribute his otherwise reactive components in an inhomogenous manner. Assuming, *arguendo*, one would follow the Examiner's suggestion of combining the teaching of Boutillier with Abend, one would add the non-reactive tackifying resin of Boutillier to the already inhomogenous mixture of Abend. This would lead to a composition with little or no adhesive action since there would be little or no cross-linking reaction possible. Thus, the combination of Abend and Boutillier as suggested by the Examiner would result in a product with little or no cross-linking and would not be very useful as an adhesive. Second, there is no suggestion to do away with the inhomogenous distribution of the Abend reactive hot-melt components to arrive at the presently claimed invention. Thus, it is respectfully submitted that Abend either alone or in combination with Boutillier does not render applicants' invention as now claimed and that the rejection of claims 1, 3, 4, 7, 9-11, 13, 14, 16-23, 28-31 and 33-35 should be withdrawn.

Turning now to the rejection of claims 1, 3, 4, 6, 9-11, 14, 16-18, 20-23, 28-31 and 33-35 as anticipated by Vanhaeren, it is noted that Vanhaeren discloses a curable adhesive composition containing isocyanurate groups which is the trimeric compound shown at page 7 of Vanhaeren (the bonds between Z and N have been omitted in the formula shown on page 7). These trimeric isocyanurates are **symmetrically** substituted so that the isocyanate functional groups have the same


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reactivity. The isocyanurate groups of Vanhaeren are not the unsymmetrically or asymmetrically substituted isocyanates having isocyanate functions of different reactivity a claimed by applicants herein.

Accordingly, Vanhaeren fails to disclose or suggest, expressly or inherently, the unsymmetrically substituted aliphatic or aromatic di- and polyisocyanates having isocyanate functions of different reactivity as claimed herein. Accordingly, it is respectfully submitted that applicants invention is neither anticipated nor rendered obvious by Vanhaeren. Therefore, the rejection of claims 1, 3, 4, 6, 9-12, 24, 26-28, 20-23, 28-31 and 33-35 should be withdrawn and the same is hereby respectfully urged.

It is believed that no fees or charges are required at this time in connection with the present application; however, if any fees or charges are required at this time, they may be charged to our Patent and Trademark Office Deposit Account No. 03-2412.

Respectfully submitted,  
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